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Language and Knowledge in Wittgenstein

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If I have seen further, it is by standing upon the shoulders of giants.
Sir Isaac Newton

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ABSTRACT

The aims of this dissertation are to both analyze and problematize the relationship between two key concepts in philosophy – language and knowledge – using Ludwig Wittgenstein's work. A *corpus* constituted by Wittgenstein's main texts was assembled for the analysis. The main works that make up this *corpus* are the *Notebooks 1914-1916*, the *Tractatus Logico-Philosophicus* and the *Philosophical Investigations*. In this dissertation, it is argued that the concepts of language and knowledge are interconnected, that our access to reality is dependent on our language and that the construction of knowledge is a process intrinsically dependent on language.

Keywords: Intelligence, Knowledge, Language, Logic, Wittgenstein

RESUMO

O objetivo desta dissertação é o de analisar e problematizar a relação entre dois conceitos fundamentais em filosofia – linguagem e conhecimento – tendo por base o trabalho desenvolvido por Ludwig Wittgenstein. Para a realização do trabalho que aqui se apresenta constituiu-se um *corpus* de análise a partir das principais obras de Ludwig Wittgenstein, entre as quais se realçam *Cadernos 1914-1916*, o *Tractatus Logico-Philosophicus* e as *Investigações Filosóficas*. Nesta dissertação argumenta-se que os conceitos de linguagem e conhecimento estão interrelacionados, que o nosso acesso à realidade é dependente da nossa linguagem e que a construção do conhecimento é um processo intrinsecamente dependente da linguagem.

Palavras-chave: Conhecimento, Inteligência, Linguagem, Lógica, Wittgenstein

Contents

Abbreviations

BB	*The Blue and Brown Books*
NB	*Notebooks 1914-1916*
NL	Notes on Logic
OC	*On Certainty*
PG	*Philosophical Grammar*
PI	*Philosophical Investigations*
RFM	*Remarks on the Foundations of Mathematics*
TLP	*Tractatus Logico-Philosophicus*

1. Introduction

In an ever more rapidly changing world, the question of whether the changes are taking us in the right direction is increasingly pertinent. As globalization permeates every tissue of modern society, people from different cultures blend together and an increasing number of people speak multiple languages fluently, we are left wondering what that means for human language. Looking back into history, we see that as languages evolved from mere simple dialects into more complex forms of communication, cave drawings appeared, and then finally writing, humans were able, somewhere along the way, to gain knowledge.

Language was fundamental in terms of providing a means for communication between people which has produced different forms of knowledge. Moreover, if we look back to the first traces of written text, we come to the realization that in human evolution, written forms of communication represent only a very small fraction of our time in history, while representing at the same time our most prolific period. Shall we then conclude that the evolution of human language is what makes knowledge and all other forms of evolution possible and, if we dare to go one step further, to the realization that the ever quickening pace of change in the world is due to nothing but increasingly rapid changes in human language?

1.1 Motivation

Knowledge is an elusive topic, as David Lewis has shown[1], with several different theories and perspectives behind its construction and several others threatening it. In fact, Descartes's "demon" cannot be logically dismissed, and Kant made a powerful case[2] that our access to reality is limited to representations of it, and that access to the *Ding an sich* is impossible from our human perspective. Obviously, we cannot *a priori* dismiss a skeptical view on knowledge, but we need to make some assumptions in order to move forward and establish a system where

[1] Lewis, D. "Elusive Knowledge". *Australasian Journal of Philosophy* 74(4), 1996, 549–567.
[2] Kant, I. *Critique of Pure Reason.* Cambridge: Cambridge University Press, 1998.

knowledge is in fact possible. What these assumptions are constitutes part of the motivation behind this work.

Since the beginning of his philosophical studies, Ludwig Wittgenstein wanted to use logic to understand our place in the world. He famously wrote in one of his notebooks:

> Logic must take care of itself (NB, 22.8.14)

With the *Notebooks 1914-1916*[3] and even before, with the Notes on Logic (NL), included as Appendix A to the *Notebooks*, Wittgenstein wanted to do nothing more than to discover "the logic" behind the fabric of "reality". While the "early" Wittgenstein might have thought he had discovered the logic behind reality at the end of his *Tractatus Logico-Philosophicus*[4], the "later" Wittgenstein[5] was more cautious when reaching conclusions, as we can see in the *Philosophical Investigations*[6]. However, Wittgenstein's work on the complexity of language demonstrates that a link exists between language and knowledge. As he states in *On Certainty*[7]:

> You must bear in mind that the language-game is so to say something unpredictable. I mean: it is not based on grounds. It is not reasonable (or unreasonable).
>
> It is there - like our life. (OC § 559)
>
> And the concept of knowing is coupled with that of the language-game. (OC § 560)

[3] Wittgenstein, L. *Notebooks 1914-1916*, 2nd edn. Edited by G. E. M. Anscombe and G. H. von Wright. Translated by G. E. M. Anscombe. Oxford: Blackwell, 1979.
[4] Wittgenstein, L. *Tractatus Logico Philosophicus.* Translated by C. K. Ogden. London: Routledge, 1922.
[5] See section 2.4 for a discussion of the "early" vs the "later" Wittgenstein.
[6] Wittgenstein, L. *Philosophical Investigations*. Edited by G.E.M Anscombe and R. Rhees. Translated by G. E. M. Anscombe. Oxford: Blackwell, 1953.
[7] Wittgenstein, L. *On Certainty.* Edited by G. E. M Anscombe and G. H. von Wright. Translated by D. Paul and G. E. M. Anscombe. Oxford: Blackwell, 1969.

As human society turns into an ever more data-centric one, the famous saying stating that "Knowledge is power", first attributed to Sir Francis Bacon[8], gains a particular relevance. In fact, data is not knowledge *per se*, but can undoubtedly be one of its biggest sources, to the point of being called "the world's most valuable resource" in the present[9]. Looking further ahead into the future and to what it holds, one cannot but wonder about the limits of our reality, and how they might be expanded if something like an artificially intelligent being is brought into existence, challenging Wittgenstein's much-quoted phrase "*The limits of my language* mean the limits of my world" (TLP 5.6).

1.2 On Language

Written language is, as Galileo put it in his *Dialogo*[10], a way to communicate one's "most secret thoughts to any other person ... with no greater difficulty than the various collocations of twenty-four little characters upon a paper".

In fact, humanity's ability to effectively communicate through the use of a language, both verbally and textually, marks one of the greatest achievements in human evolution. But how can we define language? Is there a universal language or are there multiple types of language? What are the limitations of language? I will shortly provide an overview of these topics.

1.2.1 The Concept of Language

Let us start by looking at the definition of language in the dictionary. According to the *Cambridge Online Dictionary*[11], language is "a system of communication consisting of sounds, words, and grammar, or the system of communication used by people in a particular country or type of work".

[8] I here refer to Bacon's *Meditationes Sacrae,* 1597.

[9] Cf. "The world's most valuable resource is no longer oil but data". The Economist, May 2017: https://www.economist.com/leaders/2017/05/06/the-worlds-most-valuable-resource-is-nolonger-oil-but-data

[10] Galilei, G. *Di Dialogo di Galileo Galilei Linceo Matematico Supremo dell Studio di Padova, e Pisa. Dove ne i congressi di quattro giornate si discorre sopra i due massimi Sistemi del Mondo Tolemaico, e Copernicano,* 1633.

[11] Cf. Cambridge's Online Dictionary, "language", https://dictionary.cambridge.org/dictionary/english/language.

Examples:

a) She does research into how children acquire *language*.
b) Do you speak any foreign *languages*?
c) I am hopeless at learning *languages*.
d) the English *language*
e) legal/technical *language*
f) the *language* of business
g) Java and Perl are both important computer programming *languages* (= systems of writing instructions for computers).

This definition, together with the examples provided, helps us to understand how broad the concept of language is, and how it easily gains new meanings, namely with digitalization and the advent of computer programming languages. Yet, this definition does not show us the full picture. In fact, language is what stands between a receiver and an emitter of a message, but it is hard to grasp the full concept. If we ask the question "is music a language?", most of us would surely say "yes". And music, as a language, can transmit emotions, states of emotion or messages, as for instance a written language could. Are painting and photography languages? There is the saying that a picture is worth a thousand words, so we must be inclined to answer positively. Andrew Carstairs-McCarthy[12] uses studies done on vervet monkeys, in which Cheney and Seyfarth[13] show that these primates establish complex social relationships and effectively communicate through call systems to demonstrate that the communication mechanisms available to these primates is not so different from those of human languages. But then, what differentiates human language from the ways in which animals communicate? Human languages are certainly more complex and present more varied forms, but is not the goal very similar, namely to transmit a message? With this in mind and considering the assumption that language is only valid for humans, how can we then define language in a way that is clear and well limited?

[12] Aronoff, M. and Rees-Miller, J. (ed.). *The Handbook of Linguistics.* Oxford: Blackwell, 2001, 1-20.
[13] Cheney, D. L., and Seyfarth, R. M., "The representation of social relations by monkeys". *Cognition* 37(1-2), 1990, 167–196

At first sight, it appears that the answer to our last question is that we cannot define language in any clear and well limited manner. But what if we recede from the concept we generally use and reflect on the fundamental reason why we use what we call language? Considering this from a different perspective, how would we create a reality where we would place beings gifted with reasoning and external sensorial inputs able to interpret that 'virtual' reality? We think that language is precisely the tool we have to interpret reality. Using a different example and considering a computer chip, which is connected to a temperature sensor (a common thermometer), if we think, then, about how we make the computer chip 'bip' every time the temperature exceeds a limit threshold, a programming language is usually in between the two.

Language seems to be exactly what stands between our reason and our senses. When we are speaking our native tongue or a language which we perfectly master, our thought is completely coherent and dependent on that language. When someone speaks to us, we do not have to think about the meaning of the words spoken. It almost seems to us as if our language interpretation skills are intuitive, instinctive and natural. When we hear a musical masterpiece, transmitting calmness and joy to us, we are also not thinking about the meaning of those frequencies, combined with the timbre of the notes being played, even though the effect on our brain is still there. Why is that so? Is it then possible that, through experience, our brains, via our languages, interpret reality? Is it then possible to think without a language? What would this mean for how we think about animal "languages"?

In what follows, I will hopefully shed some light on these issues and also attempt to shed light on whether our definition of language can ever be applied outside an academic context. Our questions do not seem to be out of place and it was only in 2006 when Chomsky confirmed how far behind we still are regarding the study and comprehension of the human language:

> [t]he study of language and other higher human mental faculties is proceeding much as chemistry did, seeking to "establish a rich body of doctrine", with an eye to eventual unification, but without any clear idea of how this might take place.[14]

[14] Chomsky, N. *On Nature and Language.* Cambridge: Cambridge University Press, 2002.

Two other concepts are important when we come to look at Wittgenstein's work. These concepts are 'assertion' and 'proposition'. Giving the quasi-technical nature of these concepts and the broad range of definition they encompass, I will use a definition which I believe to be coherent with Wittgenstein's use of these concepts.

> *Assertion: A linguistic act - either spoken or written - that has a truth value.*
>
> *Proposition: The content of an assertion, the underlying meaning of that specific linguistic act.*

1.2.2 Language Acquisition

The process behind language acquisition has puzzled mankind for millennia. Protagoras (490-420 BC), Plato (428-348 BC) and Aristotle (384-322 BC) were among the first philosophers to associate words with ideas and with the interpretation of reality[15]. They hypothesized that the origin of language might have to do with human speech organs and brain structure, but did not present us with consequential developments. The majority of the literature written at that time is of a philosophical nature and focused on questions pertaining to rational doubt, namely whether language is natural to or a creation of man. With questions without answers, it was only natural that the inquisitive nature of man led him to start experimenting. Frederick II of Sicily (1194-1250 AD) allegedly carried out experiments on people to get a better understanding of reality through reasoning. One of these experiments consisted in imprisoning new-born children, who were kept alone, to see if they would develop any natural language as their voices matured. The result was that those children were speech impaired and could only communicate through clapping their hands and using gestures[16]. Experiments similar to this one have been performed since then with

[15] See https://plato.stanford.edu/entries/sophists/ (accessed 10/05/2019), with reference to Plato's *Cratylus* and Aristotle's *De Interpretatione*.

[16] Baird, J. L et al., *The Chronicle of Salimbene de Adam.* Binghamton, New York: Medieval & Renaissance Texts & Studies, 1986.

the same results. Children reared in that way do not possess the ability to speak and can only communicate with each other through signs. *L'Enfant Sauvage* is perhaps one of the best examples of this[17] .

In Europe, religious authority and a dogmatic culture prevented further developments of the topics related to the origin and development of languages until the fifteenth century with the protestant reformation and later the Enlightenment. The introduction of the *Index Librorum Prohibitorum* by the Roman Catholic Church is one of the best examples of attempts made to limit autonomous critical thinking among Catholics. This Index, only formally abolished in the twentieth century, contained works such as Johannes Kepler's *Epitome astronomiae Copernicanae* and Immanuel Kant's *Critique of Pure Reason*. It was only in the nineteenth century that Darwin presented us the rationale for a better understanding of how the human language may have evolved and why[18]. In fact, his idea that humans have an "instinct to learn" reveals how the development of knowledge allowed for a faster adaptation and evolution as a species[19]. This, coupled with his "Musical Protolanguage" hypothesis, sets up the rationale for understanding how important knowledge is for us as a species and the role that language played in our development and in the development of knowledge itself. By now it seems clear that the ability for humans to learn languages is innate[20]. The question that might still arise is whether or not this ability to learn languages appears as a constraint of the type "If and only if...' in the knowledge construction process. It appears to be so, as children raised without access to language and to a normal development are forever impaired in their cognitive functions and, therefore, limited in their knowledge construction process.

[17] Itard, J., "Mémoire (1801) et Rapport (1806) sur Victor de l'Aveyron", in *Les enfants sauvages: mythes et réalité*. Paris: Éditions Frances Loisirs, 2002, 119-246.

[18] Darwin, C. *The Descent of Man and Selection in Relation to Sex*. London: John Murray, 1871.

[19] Darwin develops these ideas on both his works: Darwin, C. *The Descent of Man and Selection in Relation to Sex*. London, 1871, and *On the Origin of Species*. London, 1859.

[20] Marler presents the idea that the ability to learn is instinctive in "The instinct to learn", in Carey, S. and Gelman, R. (eds.), *The Epigenesis of Mind: Essays on Biology and Cognition*. Hillsdale, NJ: Erlbaum, 1991, 37-66. Fitch is another author that can be used with reference to this subject. For more details, see Fitch, W. T., "Innateness and human language: A biological perspective", in Tallerman, M. and Gibson, K. R. (eds.), *The Oxford Handbook of Language Evolution*. Oxford: Oxford University Press, 2011, 143-156.

In 2017, Fitch established a comprehensive review of the empirical approaches used to study language evolution, showing how dispersive and complex the study of the human language is, suggesting that a "deep understanding of this ancient problem may be attainable in the next few decades"[21].

1.3 On Knowledge

The origin of all the difficulties associated with knowledge starts and ends with the human being, which, whilst rational in nature, is also sensorial in nature. This anthropological dichotomy between rationality and sensibility raises barriers in our access to reality, preventing it from being truly objective. In addition, our biological structure does not allow us to have complete access to this reality. It is in fact not difficult to accept Kant's thesis that our natural way of thinking, primitive and biological in nature, leads us to believe that we truly have access to the thing in itself (*Ding an sich*), and not to seeing what we consider to be the thing in itself as a mere representation of reality. Throughout history, various thinkers have reached the same conclusion, namely that, for example, when looking at a statue, we do nothing more than to look from only one perspective at a time. We shall never be able to see all its sides in synchrony, and simultaneously perceive the interior of the marble that constitutes the statue, accessing the carbon molecules that integrate the marble.

The following subsections will present a short overview of the concepts of knowledge (1.3.1) and its possibilities (1.3.2).

[21] Fitch, W. T., "Empirical approaches to the study of language evolution", *Psychonomic Bulletin and Review* 24(1), 2017, 3-33.

1.3.1 The Concept of Knowledge

Let us start by looking at the definition of knowledge in the dictionary. According to the *Cambridge Online Dictionary*[22], "knowledge" is "understanding of or information about a subject that you get by experience or study, either known by one person or by people generally".

Examples:

a) Her *knowledge* of English grammar is very extensive.
b) He has a limited *knowledge* of French.
c) The details of the scandal are now common *knowledge* (= familiar to most people).
d) She started to photograph the documents, safe in the *knowledge* that (= knowing that) she wouldn't be disturbed for at least an hour.
e) In this town there are only a couple of restaurants that to my *knowledge* (= judging from my personal experience and information) serve good food.

This definition, while satisfactory for most inquirers, does not suffice for us. In fact, the examples presented above can at most be partly used as arguments in favor of Wittgenstein's view of language-games (*Sprachspielen*)[23]. Furthermore, Wittgenstein followed a similar line of thought when he wrote on the *Blue Book:*

> When Socrates asks the question, 'What is knowledge?' he does not even regard it as a preliminary answer to enumerate cases of knowledge. If I wished to find out what sort of thing arithmetic is, I should be very content indeed to have investigated the case of finite cardinal arithmetic. (BB p.20)

[22] Cf. Cambridge's Online Dictionary, "knowledge", https://dictionary.cambridge.org/dictionary/english/knowledge
[23] *Language-games*, a concept introduced by Wittgenstein, defines the usage of language in a way that its understanding depends on certain rules, in close resemblance to a game. The understanding of the rules employed in a certain scenario allows the subject to play that "game". In the same way that a football player has to be aware of all the things he or she can and cannot do in order to score a goal, a subject "playing" a language-game needs to be aware of the rules/context, otherwise implicit information can be lost and figures of speech such as irony can be mis(or not)understood. See §2 of the *Philosophical Investigations* for Wittgenstein's own examples used to illustrate the concept.

The word 'knowledge' as seen above does not possess one unique "meaning", or "reference", in Frege's terminology, and its use in a sentence defines the objective with which it is employed by the speaker. This represents an example of what Wittgenstein tries to explain in his *Philosophical Investigations*:

> When philosophers use a word - "knowledge", "being", "object", "I", "proposition", "name" – and try to grasp the *essence* of the thing, one must always ask oneself: is the word ever actually used in this way in the language-game which is its original home? –
>
> What *we* do is to bring words back from their metaphysical to their everyday use. (PI § 116)

The context in which a given word is employed and the actors of the situation in which the word is employed make possible the language-games. A good example we can use to understand the usefulness of this concept is irony, where a speaker, usually through the employment of a falsehood, tries to convey a message of truth. The language-games illustrated above suffice to make us doubt that we can ever define a concept with such clarity such that it is perfectly prescribed and limited in use and meaning. Looking for a philosophical definition of the concept of knowledge, we must start with Plato, who defined knowledge as a "justified true belief"[24]. This definition asserts that for someone to know, it is not enough to say something that is true, for that is not knowledge. For one to know something, according to Plato's definition, one must have a propositional attitude of truth towards something which corresponds to reality (is true) and that is justified, meaning that one must be able to present proof or testimony to support the claim.

It was in 1963 when Edmund Gettier published a paper entitled "Is Justified True Belief Knowledge?"[25], where through what became known as "Gettier-cases", he showed that one can

[24] Cornford, F. M. Plato's *Theory of Knowledge: The Theaetetus and the Sophist of Plato.* London: Butler & Tanner Ltd, 1935.
[25] Gettier, E., "Is justified true belief knowledge?", *Analysis* 23(6), 1963, 121-123.

have a justified true belief regarding a claim but still fail to know. How can this be so? This happens if the reasons for the belief, although justified, are false. I quote at length:

> ...Smith has strong evidence for the following proposition:
>
> (f) Jones owns a Ford;
>
> ... Smith selects three place names quite at random and constructs the following three propositions:
>
> (g) Either Jones owns a Ford, or Brown is in Boston;
>
> (h) Either Jones owns a Ford, or Brown is in Barcelona;
>
> (i) Either Jones owns a Ford, or Brown is in Brest-Litovsk.
>
> Each of these propositions is entailed by (f). Imagine that Smith realizes the entailment of each of these propositions he has constructed by (f), and proceeds to accept (g), (h), and (i) on the basis of (f).
>
> Smith has correctly inferred (g), (h), and (i) from a proposition for which he has strong evidence. Smith is therefore completely justified in believing each of these three propositions. Smith, of course, has no idea where Brown is. But imagine now that two further conditions hold. First, Jones does not own a Ford, but is at present driving a rented car. And secondly, by the sheerest coincidence, and entirely unknown to Smith, the place mentioned in proposition (h) happens really to be the place where Brown is. If these two conditions hold, then Smith does *not* know that (h) is true, even though *(i)* (h) is true, *(ii)* Smith does believe that (h) is true, and *(iii)* Smith is justified in believing that (h) is true.[26]

This problem has been partially overcome by either dismissing these cases by stating that the Gettier cases involve insufficient levels of justification (a), by adding a fourth condition to validate a knowledge claim (b) or by trying to replace the justification criteria by other condition (c).

[26] Ibid.: 122-123.

However, even if we admit (a) as being the reasonable response to the Gettier cases - by saying that Smith has no justification for claiming that Brown is in Barcelona - and that, therefore, his knowledge claim is not valid, the problem at hand still stands. What constitutes knowledge or, proceeding from (a), what constitutes sufficient levels of justification? If the standard for the attribution of these levels of justification are very high, then we fall into the skeptical trap. If we say that the standards of justification depend on the context, then we fall into contextualism. It seems as if well-defined boundaries for knowledge attribution are non-existent if we want to leave skepticism aside.

1.3.2 Knowledge Possibilities

One of the biggest challenges that knowledge faces is skepticism because it is logically very hard, if not impossible, to dismiss. In truth, when skeptics affirm that due to our limitations in terms of access to reality, we do not have the possibility of making knowledge attributions of any sorts, they present a strong case and seem to be correct. (We should however note that by saying that sceptics seem to be correct we are already making a knowledge attribution, which in principle goes against the global skeptic formulation. Nonetheless, it is hard to deny that a lot of our knowledge is insecure). This theme, which sparks great debate, has led many authors into trying to find ways to refute skepticism. Contextualism is one of the theories that pursues this objective. Contextualists argue that, on most occasions, we need not to adopt standards of knowledge equivalent to those proposed by skeptics under the risk of not being able to affirm anything.[27] In the *Tractatus*, Wittgenstein wrote that "[w]hat can be said at all can be said clearly; and whereof one cannot speak thereof one must be silent" (TLP, Preface). A radical skeptical perspective regarding this sentence would lead us to remain utterly in silence about everything. Sosa responds promptly to this skepticism in "Knowledge in Context, Skepticism in Doubt"[28]. But what can we really assert to be "knowledge"? Contextualism argues that knowledge depends on the

[27] For an overview of epistemic contextualism, see Venturinha, N., *Description of Situations: An Essay in Contextualist Epistemology* (Cham: Springer, 2018).

[28] Sosa, E., "Knowledge in context, skepticism in doubt: The virtue of our faculties", *Philosophical Perspectives* 2, 1988, 139–155.

context in which the subject is inserted. This context, which can vary socially or following the meanders of a conversation, establishes the standards for our knowledge attributions[29]. Sosa builds on this idea by claiming that context determines which viable alternatives we ought to take into consideration when attributing knowledge[30], defending that context can also provide viable alternatives for a given reality, and that might justify a change in the standards for knowledge attribution.

1.4 Objectives

As human languages expand in reach and form, from being written modes of communication to being instruments and technology that allow humans to computerize, mechanize and automate various tasks, we cannot but wonder if there are actual limits to human ingenuity, to human languages, to human knowledge and, ultimately, to human reality. In fact, when we state that the universe is infinite, are we implying that it has no limits physically or that we cannot reach (comprehend) these limits yet? By structuring the questions we would like to see answered, we get a better view of the objectives we propose ourselves:

(i) Is knowledge even possible or are we (according to Wittgenstein) saying what should not be said?

(ii) If knowledge is possible, in which conditions is it so? Are there limits to it?

(iii) What is the relation between knowledge and language?

(iv) Would knowledge be possible without a language?

(v) What would the creation of an artificially intelligent being imply for knowledge?

[29] Cohen and DeRose are relevant references regarding contextualist views on knowledge attributions. For more details, see Cohen, S., "Knowledge and context", *The Journal of Philosophy* 83, 1986, 574–583, and DeRose, K. *The case for contextualism: Knowledge, skepticism, and context*. New York: Oxford University Press, 2009.

[30] For Sosa's view on relevant alternatives, see Sosa, E., "Relevant alternatives, contextualism included", *Philosophical Studies* 119, 2004, 35–65.

Wittgenstein's work and subsequent academic research on the topics developed by this author can help us to reflect upon the foundations of knowledge, and demonstrate that language can be seen as the mechanism that allows for a constructive interpretation of reality. This will require establishing assumptions and putting aside certain perspectives, namely skeptical ones, in order to demonstrate that knowledge is possible and in which conditions that is so. In this sense, the primary goals of this dissertation are:

a) to use Wittgenstein's work to show that there is a link between language and knowledge;
b) to show that knowledge is possible and that human evolution is driven by the development of knowledge;
c) to show that we, in fact, are limited by our language and that more knowledge is only possible when we expand our language.

Second, we want to look further ahead into the future and try to glimpse into what it might hold. What will be revealed to us by the advent of artificial intelligence? Should we proceed full steam ahead? What are the challenges we might expect? Inside a fully mechanized society, what place is left for the human being?

1.5 Thesis Outline

This dissertation is divided into 4 chapters, including the present, introductory one.

Chapter 2 sets the ground for knowledge attributions, to the conditions required for us to establish knowledge, and to try to dismiss the skeptical perspective of whether we are ever able to know. In this chapter we also try to understand how exactly it is that knowledge is constructed by children and how the human construction of knowledge led us to our current civilizational status.

Chapter 3 intends to introduce us to the balcony which we arrive at having used Wittgenstein's ladder. In this chapter, the analysis of how Wittgenstein's work can truly be seen as a ladder, which we have to use and then let go of, will be performed, namely in terms of how can we use Wittgenstein's work as a way to improve knowledge acquisition. This chapter also includes a short analysis of artificial intelligence.

Finally, chapter 4 presents the conclusions of this dissertation and how the work developed could be improved or built on, with the aim of gaining a closer look at the logical place Wittgenstein thought of.

2. **Language and Knowledge**

In this chapter the relation between knowledge and language will be analyzed. Firstly, we shall begin by presenting Wittgenstein's perspective on language (section 2.1). Afterwards, we will present Wittgenstein's perspective on knowledge (section 2.2). Later, we will use Wittgenstein's work to show that there is a link between language and knowledge (section 2.3). The final two sections of this chapter will be dedicated to a chronological analysis of Wittgenstein's work, where a comparison between his early and later work will serve as a canvas for the hypothesis we will present regarding knowledge acquisition and the role played by language in this process (section 2.4).

2.1 Wittgenstein on Language

In proposition 5.6 of the *Tractatus* Wittgenstein writes: "*The limits of my language* mean the limits of my world." This proposition embodies, in a certain sense, the early Wittgenstein's perspective on language. What is at stake is that language relates us in a strict way with the world, with our world, and logic is intrinsically connected with language. Wittgenstein also says that:

> It is no more possible to present something "contradicting logic" in language than to present a figure contradicting the laws of space in geometry by means of its co-ordinates, or, say, to give the co-ordinates of a point that does not exist. (NB, 16.5.15)

Given that logic is so connected with our language, our limits seem to locate themselves precisely at the boundaries of it. In this way, how does proposition 5.6 of the *Tractatus* allows us to think critically and objectively about our own logical limits? Besides this question, which we believe to be fundamental, two others arise:

(i) Are we (logically) totally limited by our own language?

(ii) If we are totally limited by our own language, does that mean that in order for us to expand our world we have to expand our language? But how can this be?

If the possibility of expanding our language did not exist, our world would be unique and unchangeable throughout our existence. This idea is, however, incoherent with the human experience. As children, we learn how to speak, how to read, how to write, how to perform mathematical operations, we learn about geography and history. Would any of these actions be possible without language? As we grow up and our understanding of the world augments, we see the need to expand our comprehension of the reality that surrounds us. We pursue careers in mathematics, in physics, in linguistics, fine arts and architecture. The need to understand different cultures makes us learn new languages. The desire to understand a symphony might lead us to study musical theory. Would any of this be possible without language? Let us assume, for now, that we can indeed expand our language. If that is the case, can our language be unique?

> But is *language*: the *only* language? (NB, 29.5.15)

Proposition 5.61 of the *Tractatus* reveals a clear association between language and logic saying that "Logic fills the world; the limits of the world are also its limits". The limits of the world must therefore be tantamount to logic, which means that the language must also coincide with logic or, at the very least, be ruled by it. Wittgenstein clarifies this idea and answers the question he himself had placed on 29 May 1915:

> That the world is *my* world, shows itself in the fact that the limits of the language (*the* language I understand) mean the limits of *my* world. (TLP 5.62)

What may look like a purely solipsist perspective on existence is much more than that.[31] With this proposition Wittgenstein is (indirectly) saying that our access to existence is not only dependent on the representation we make of existence through the use of our senses, but that this representation is also dependent on our language, which is individual and establishes the limits of our (individual) reality. This leads him to the conclusion that "I am my world. (The microcosm.)" (TLP 5.63)

The idea that we are our own world is admissible and logically so, if we think of ourselves as entities separated from the reality that surrounds us and that, at the same time, we cannot dissociate ourselves from that same reality. If we believe in the laws of physics, we cannot but wonder about how humans once believed that the earth was the center of the solar system and the entire universe. This change from a geocentric perspective to a heliocentric one represents nothing more than a language expansion, representing an expansion of how we perceive the reality of our own world. In this sense, proposition 5.63 makes an important contribution to the understanding that each individual being is a microcosm of reality and that the conception of a "macro" reality is different for each being.

At this point, an important question arises: more vital than knowing if language establishes the boundaries of our own world, one can ask: does language itself have a limit? If so, then it means that the limits of our world are in fact well defined, even though we cannot perceive/reach them yet.

On the other hand, if language is unlimited, does that mean that our world is also limitless? It is well known that the fact that A implies B does not mean that B implies A reciprocally. Being bound by language (from within), it might be difficult to ever answer this question without creating room for uncertainty. But we can think that, as a fish in an aquarium can realize that there is a reality beyond the glass, so we might as well be able to realize that there is something beyond the frontiers of the reality that permeates us. However, the fish that

[31] A complete discussion of the issue of solipsism in Wittgenstein lies outside the scope of this work. See Hacker. P. M. S., *Insight and Illusion* (Bristol. Thoemmes Press, 1997), Chapters IV and VIII, and Venturinha, N., *Lógica, Ética, Gramática* (Lisbon: Imprensa Nacional-Casa da Moeda, 2010), §8, as well as Venturinha, N., "Wittgenstein Reads Nietzsche: The Roots of Tractarian Solipsism", in Ramharter, E. (ed.), *Unsocial Sociabilities: Wittgenstein's Sources* (Berlin: Parerga, 2011), 59-74.

extracts oxygen from the water he lives in does not have access to the reality beyond the limits made by the aquarium tanks. Can our own thoughts also be limited by something like the tanks in which fishes live in an aquarium? On this particular subject, Wittgenstein said that his goal in philosophy would be precisely to try and discover the limits of our reality, so that we, as the fish, can see beyond these limits.

> What is your aim in philosophy?--To shew the fly the way out of the fly-bottle. (PI, Part I §309)

Wittgenstein searches then for the limits of our language, the limits of logic:

> It is all simply a matter of the existence of the logical place. But what the devil is this "logical place"?! (NB, 19.11.14)

It is hard for us to conceive of an unchangeable logic that dictates which rules limit our human language-games, a pure, mathematical logic, which explains in which way thought is formed and in which way we can modify it.[32] In order for us to achieve this, we would have to be able to move beyond the limits of language or, at the very least, be able to expand our language beyond a certain threshold. Nonetheless, thinking about great minds in history, responsible for the greatest feats of mankind, we come across a complication. It seems clear that, for instance, the discovery of the general relativity theory, by Albert Einstein, led to a significant expansion of what the limits of reality are. However, we may ask, *whose* reality is expanded by this theory? It seems certain that Albert Einstein only broadened the limits of language for those that could understand his discoveries and investigations. Of course the rest of the population benefited from Einstein's

[32] This is perhaps one important reason why Wittgenstein changed his line of reasoning from the *Tractatus* and the search for the logic behind thought and language to the *Investigations* and the establishment of language-games.

achievements, but has the language of these people been expanded in the same manner as the scientific community's language for whom this discovery was a disruptive event?

Up to this point, we can say that Wittgenstein's work does indeed show that our language is connected with our understanding of reality, that our language is individual in nature, as it modulates each one's thought and reality acquisition processes, and that our language is expandable. We have not yet been able to understand if language is or is not limited and what the role of language is in knowledge attributions and knowledge construction processes. The next sections will address these topics.[33] To finish this section, let us realize that we are without doubt lost in a maze constructed by ourselves through language or, as Wittgenstein put it in *Philosophical Grammar*[34]:

> Human beings are entangled all unknowing in the net of language. (PG, 462)

2.2 Wittgenstein on Knowledge

Although Wittgenstein's work is generally better known for his focus on logic and the nature of language, he also reflected on epistemic notions such as "knowledge", "belief", "doubt" and "certainty". These reflections are more evident in the work posthumously published as *On Certainty*.[35] In this section, we will try to show how Wittgenstein's philosophical reflections can help us judge epistemic concepts and notions.

In section 1.1, we have already shown how Wittgenstein can state that the concept of "knowledge" is coupled with that of "language-game" in *On Certainty*. But how do Wittgenstein's views on logic and language allow for an understanding of what knowledge might be and how it

[33] Later Wittgenstein seems not to be so rigid in regard to the relation between language and reality. However, here I am still interested in the relationship between thought, reasoning and language, and I am considering mainly the *Tractatus.*

[34] Wittgenstein, L. *Philosophical Grammar*. Edited by Rush Rhees. Translated by Anthony Kenny. Oxford: Blackwell, 1974.

[35] On the edition of *On Certainty*, see Venturinha, N., "A Re-Evaluation of the *Philosophical Investigations*", in Venturinha, N. (ed.), *Wittgenstein After His Nachlass* (Basingstoke: Palgrave Macmillan, 2010), 143-156.

might be constructed? Let us start by presenting some of the author's propositions from the *Tractatus* and the *Notebooks* and follow that with an analysis of those propositions.

On 22 August 1914, Wittgenstein wrote that "Logic must take care of itself". Two months later he would reinforce this idea by saying "Logic takes care of itself; all we have to do is to look and see how it does it." (NB, 13.10.14) This proposition would later on reappear in the *Tractatus* [TLP 5.473] and represents the concept that would develop into the thought behind "logical space". This idea of "logical space", similar in significance to Plato's "world of ideas" and Frege's "third realm", represents the idea that there is a segregated space where logic lies.[36] The notion that something as a logical place might exist appears when Wittgenstein finds it difficult to establish a direct relationship between reality, logic and language.

> I always said that truth is a relation between the proposition and the situation, but could never pick out such a relation.[37]
>
> …
>
> The proposition is a model of reality as we imagine it. (NB, 27.10.14)

With the statements above, two very important aspects emerge. The first is that the true value of a given proposition is related with the fact, that is, with reality in itself. The second is that the proposition is a model of reality, which means that language is a model of reality. However, Wittgenstein cannot establish in which way the proposition relates to a fact, which is obvious once we think about our language limitations[38]. How is this related to knowledge? He writes:

[36] Even though Wittgenstein appears to be critical of Frege's view about logic (see *Tractatus* 4.0312, for example), he, like Plato and Frege, has a metaphysics that goes with his views about logic.

[37] This can be seen as an anticipation of the problems Wittgenstein would encounter (or re-encounter) later on and that made him change his perspective on language from the *Tractatus* to the *Investigations.*

[38] We can never really access the fact, the same way that we do not have access to reality in itself. Our cognitive/sensitive limitations do not allow us to establish the relation between fact and the content of an assertion.

> In order to be able to frame a statement at all, we must--in some sense--know how things stand if the statement is true (and that is just what we portray).
> The proposition *expresses* what I do not know; but what I must know in order to be able to say it at all, *I shew in it*. (NB, 24.10.14)

So, in order for us to assert something about anything, we need "to know" what we are asserting. This makes sense given the definition of assertion presented in section 1.2.1. But, then, what is it "to know"? Is it possible that we are standing in front of a chicken and egg situation[39]? It seems as if knowledge and language are more interconnected than we might initially think. In *On Certainty* Wittgenstein states that

> **"**For "I know" seems to describe a state of affairs which guarantees what is known, guarantees it as a fact. One always forgets the expression "I thought I knew". (OC § 12)

Regarding the concept of knowledge, Wittgenstein, at times, seems close to accepting something like Plato's definition[40]. In *On Certainty*, for example Wittgenstein says:

> "If I know something, then I also know that I know it, etc." amounts to: "I know that" means "I am incapable of being wrong about that." But whether I am so must admit of being established objectively. (OC § 16)

[39] i.e., "a situation in which it is impossible to say which of two things existed first and which caused the other one" (cf. Cambridge Online Dictionary):
https://dictionary.cambridge.org/pt/dicionario/ingles/a-chicken-and-egg-situation

[40] Wittgenstein recognizes a lot of diversity in the way we use 'know' and not all of his views are aligned with Plato's definition of knowledge (e.g. *Philosophical Investigations*, §625 – Wittgenstein asks how you know that you have raised your arm, in §633 he discusses knowing what you were going to say).

> "I know" often means: I have the proper grounds for my statement. So if the other person is acquainted with the language-game, he would admit that I know. The other, if he is acquainted with the language-game, must be able to imagine *how* one may know something of the kind. (OC § 18)

Still, how can we guarantee something as a fact? If we go into details and use an example from quantum mechanics, Heisenberg's uncertainty principle states that both the position and the velocity of a subatomic particle, such as a proton or electron, cannot be known (known in the sense of established) for the same instant of time. What does this mean from a philosophical point of view? Does it mean that we cannot really know?

Wittgenstein proceeds with his logical enquiries by relating our use of the verb "to know" with our senses and our inner world/consciousness, and by introducing the concept of "certainty".

> "I know" has a primitive meaning similar to and related to "I see" ("wissen", "videre"). And "I knew he was in the room, but he wasn't in the room" is like "I saw him in the room, but he wasn't there". "I know" is supposed to express a relation, not between me and the sense of a proposition (like "I believe") but between me and a fact. So that the *fact* is taken into my consciousness. (Here is the reason why one wants to say that nothing that goes on in the outer world is really known, but only what happens in the domain of what are called sense-data.) This would give us a picture of knowing as the perception of an outer event through visual rays which project it as it is into the eye and the consciousness. Only then the question at once arises whether one can be *certain* of this projection. And this picture does indeed show how our *imagination* presents knowledge, but not what lies at the bottom of this presentation. (OC § 90)

The concept of *certainty* thus presupposes the concept of *doubt*. Or, to put it the other way round:

> If you tried to doubt everything you would not get as far as doubting anything. The game of doubting itself presupposes certainty. (OC § 115)
>
> Doubting and non-doubting behavior. There is the first only if there is the second. (OC § 354)

It is a contention of this dissertation that this is a valid argument against global skepticism. Wittgenstein continues his thought by exposing how we live our daily lives without doubting what we believe to be acquired certainties, that is, beliefs which are grounded on what we "learn" as being right or wrong. He claims:

> The picture of the earth as a ball is a *good* picture, it proves itself everywhere, it is also a simple picture - in short, we work with it without doubting it. (OC § 147)

However, how can one be sure he/she believes in the correct "facts"? How can we justify our beliefs? Wittgenstein gives us an answer when he avers:

> The difficulty is to realize the groundlessness of our believing. (OC § 166)

In reality, most of our beliefs and assertions are not doubted[41]. We first believe what we read in history books, what our professors tell us, what our parents teach us. We live our lives believing

[41] As Moore also shows in "Certainty". In *Philosophical Papers*. London: George Allen & Unwin, 1959.

that we are certain about multiple aspects of our reality, even if we do not have grounds for those beliefs and certainties.[42] Wittgenstein observes:

> I act with *complete* certainty. But this certainty is my own. (OC § 174)
>
> We know that the earth is round. We have definitively ascertained that it is round. We shall stick to this opinion, unless our whole way of seeing nature changes. ”How do you know that?” - I believe it. (OC § 291)

The author relates our incapacity to doubt with the way we interact through language games.

> For how can a child immediately doubt what it is taught? That could mean only that he was incapable of learning certain language games. (OC § 283)

Regarding certainty the author states that:

> With the word “certain” we express complete conviction, the total absence of doubt, and thereby we seek to convince other people. That is *subjective* certainty.

[42] From here follows the argument that led many philosophers to treat knowledge as belief. Rhees addresses this in section 12 (*On Certainty*'s Main Theme) of his *Wittgenstein's* On Certainty*: There - Like Our Life.* Oxford: Blackwell, 2003. See also Moore, G. E., “A Defence of Common Sense”. In: *Contemporary British Philosophy (second series)*, ed. J. H. Muirhead. London: George Allen & Unwin, 1925, 192-233; and Moore, G. E., “Proof of an External World”. *Proceedings of the British Academy* 25, 1939, 273-300 for the arguments that are on the basis of Wittgenstein's responses in *On Certainty.*

> But when is something objectively certain? When a mistake is not possible. But what kind of possibility is that? Mustn't mistake be *logically* excluded? (OC § 194)

The difficulty lies in logically excluding mistakes. This thought leads us to agree with Wittgenstein when in the final proposition of the *Tractatus* he states "Whereof one cannot speak, thereof one must be silent" (TLP 7). In *Philosophical Grammar*, the author expresses a similar point of view: "Where you can ask you can look for an answer, and where you cannot look for an answer you cannot ask either. Nor can you find an answer." (PG, 377). The problem with this is: what can we then talk or ask about? Should we not start to question the basic concepts underlying our language and our thought processes? But can we find our way out of the maze? Does this maze even have an exit? A passage from *On Certainty* is again illuminating:

> And in fact, isn't the use of the word "know" as a preeminently philosophical word altogether wrong? If "know" has this interest, why not "being certain"? Apparently because it would be too subjective. But isn't "know" *just* as subjective? Isn't one misled simply by the grammatical peculiarity that "p" follows from "I know p"? "I believe I know" would not need to express a lesser degree of certainty. - True, but one isn't trying to express even the greatest subjective certainty, but rather that certain propositions seem to underlie all questions and all thinking. (OC § 415)

It seems more and more as if the concepts we use in everyday language are flawed – or perhaps it is our language that is flawed – and that they do not allow for a clear understanding of what they try to define. The author had already tried to untangle these concepts earlier in *On Certainty*:

> "I have compelling grounds for my certitude." These grounds make the certitude objective. (OC § 270)

> I know = I am familiar with it as a certainty. (OC § 272)

At more than half-way through *On Certainty*, Wittgenstein implicitly suggests that the more he "knows" the more he realizes how much he does not know.

> Is my understanding only blindness to my own lack of understanding? It often seems so to me. (OC § 418)

And then, it seems as if the author tried to question the nature of our language.[43]

> Suppose that in a certain language there were no word corresponding to our "know". – The people simply make assertions. ("That is a tree", etc.) Naturally it can occur for them to make mistakes. And so they attach a sign to the sentence which indicates how probable they take a mistake to be – or should I say, how probable a mistake is in this case? This latter can also be indicated by mentioning certain circumstances. For example "Then A said to B '...' I was standing quite close to them and my hearing is good", or "A was at such-and-such a place yesterday. I saw him from a long way off. My eyes are not very good", or "There is a tree over there: I can see it clearly and I have seen it innumerable times before". (OC § 443)

Wittgenstein therefore puts certainty - and implicitly, all the remaining concepts - at the level of the language-games. He adds:

[43] In the same way that Wittgenstein tried to question and to describe logic. See §501 and Section 9 (*On Certainty*: A Work in Logic) of Rhees, R. *Wittgenstein's* On Certainty*: There - Like Our Life.* Oxford: Blackwell, 2003.

> Do I want to say, then, that certainty resides in the nature of the language-game? (OC § 457)

Wittgenstein clearly has more doubts than certainties. It seems as if our definition of knowledge is too out of reach using our language limitations. Regarding fact and truth, it seems logical that for one to know implies that one must be aware of a relation between reality and what is being said in such a way that one corresponds to the other and, as the author wrote,

> It is always by favour of Nature that one knows something. (OC § 505)

The relation between fact and reality is what seems to be unattainable. Throughout *On Certainty*, as in the *Tractatus* and the *Investigations*, Wittgenstein seems to be trying to discover what can and cannot be said, regarding our language as the grounds for our assertions and propositions. Logic plays an important part in this process, but we should be careful since our logic is tainted by our language, as we will see more in detail in the next section. Regarding Wittgenstein's works and the concept of knowledge we use on a daily basis, it seems as if knowledge is not something that appears *a priori*, nor that it is something that only belongs to a subject's inner world.

We have so far seen how difficult it is to define what knowledge is and in which conditions it is possible. In the next section, we will try to show how knowledge appears in the context of language and that it is through language that knowledge is constructed. We will end this section with a proposition from Wittgenstein's *On Certainty*, which we believe is a good starting-point for the topic under discussion in the next section.

> Knowledge is in the end based on acknowledgement. (OC § 378)

2.3 Wittgenstein and the link between Language and Knowledge

In this section we will attempt to show that even though Wittgenstein focused on logic and language in most of his philosophical reflections, his work goes hand in hand with epistemic concepts, and we cannot dissociate his reflections on logic and language from the concepts associated with knowledge.

In this phase of our work we can already state that language and knowledge are connected. However, it is the way they connect and how that allows for language and knowledge expansion that interest us the most. In light of Wittgenstein's work we can already say that in many cases knowledge presupposes a correct link between "fact" and "reality" and that a fact is true when there is a correspondence with reality.

> The first thing that the theory of logical portrayal by means of language gives us is a piece of information about the nature of the truth-relation. (NB, 20.10.14)

We will see further ahead what can be said about the fundamentals for this correspondence. Let us only say now that a fact corresponds to a thought about reality which occurs internally, which we believe as correct and which we externalize through language. Let us also say that we communicate through the usage of language and so language is both a way for us to connect our inner world to the outer one as well as a way for us to think – communicate internally. Wittgenstein showed that there are certain things about which we should remain in silence. Is that completely true? Or can we say that it is exactly by speaking up about what should not be spoken that we allow our thoughts, our logic, our knowledge and language the possibility for expansion? Do we not need to throw away the ladder Wittgenstein showed us in order to see further? How does Wittgenstein's work allow us to understand this problematic?

Let us take a look at an example. The discovery of the ratio between the perimeter of any given circumference and its own radius, the ratio demonstrated as being constant for any circumference originated the concept of π. This concept was incorporated into human language and knowledge and expanded both, but then comes the question about what lies beneath these expansions. Surely, the cause for this language and knowledge expansion was not the attribution of the symbol π to this universal mathematical reason. Then, it must have been the recognition of this ratio as a logical rule on reality. The integration of the concept π in our language is therefore independent from the symbol that we might use to designate the concept. The symbolic attribution must have come *a posteriori*. This leads us to believe that language had to do with more than the simple attribution of symbols, as Wittgenstein leads us to believe right at the beginning of his *Philosophical Investigations*:

> "Something red can be destroyed, but red cannot be destroyed, and that is why the meaning of the word 'red' is independent of the existence of a red thing." (PI §57)

Still regarding this example of the concept of π, what can we say about knowledge? Does the introduction of this concept in the science books mean that this concept has been taken on board by every human being born after that moment? The same goes for the example given about Albert Einstein and the theory of general relativity. It is easy to reply “no”. What does this mean? For one it means that knowledge, as language, is individual in nature. It also makes us wonder about the origin of knowledge and its use, in order to be able to define it. Biologically speaking, the ability to inform others about historical events or to tell them stories represents the potential to warn other members of your community about dangers you have faced, how they were overcome and many other possibilities – in summary, to teach. And what does the ability to teach represent? It represents the most significant biological advantage of all, the ability to learn – construct knowledge - without experimenting with reality. But what does “to learn” mean? To learn means to be able to understand reality. Can we then “mislearn” something? How does a

child learn how to doubt? If the teaching is incorrect – that is, does not represent reality coherently – we acquire an inadequate "knowledge". If reality proves us wrong, we understand the concept of doubt. Adapting one of Wittgenstein's examples, in several cases we say that the earth is spherical. Is the Earth mathematically spherical? It is not. Can I be certain of it? I cannot, for I have not verified it with my own eyes. Could I trust my eyes even if I did? But I believe it, for I have been told that measurements were made and even that the earth was found to be flattened around the poles. Then, what makes it fine for six year old kids to grasp the concept of earth as being perfectly spherical, and not be fine for a fifteen year old one to do so in a physics test? We can say that it is *the context*, opting for a contextualist perspective. Or, we can say that in one case, it is adequate to do so, in the sense that for a six year old it is more important to understand the concept of earth as having a round shape than the fact that the distance in a straight line between the mass center of earth and the last layer of its atmosphere varies from point to point.

This line of thought leads us to a definition of knowledge more in line with contextualism. Can we completely dismiss the skeptical argument of not being able to trust anything? We cannot. For the time being, the skeptical argument is something to pass over in silence, as it does not add anything to the table. It is true that we cannot have access to reality itself and if that means that we cannot know, then we think that the problem does not reside in reality itself but in the concept of knowledge we use. As Wittgenstein saw, if we can imagine a language where the concept of knowledge does not exist as we discuss it, and where people who use that language only make assertions of the type "That is a tree", to know or not to know turns into a nonsensical discussion. Much more important than having 100% certainty about the algorithms that constitute the number π, we believe that it is to have an adequate "knowledge" of the concept at hand. This means that sometimes the "knowledge" that π is 3.14 might be sufficient. We could imagine a language much more rational and objective, based on proposition 6.54 of the *Tractatus*[44]. Communities made out of people with a very rational and objective mindset

[44] "My propositions are elucidatory in this way: he who understands me finally recognizes them as senseless, when he has climbed out through them, on them, over them. (He must so to speak throw away the ladder, after he has climbed up on it.) He must surmount these propositions; then he sees the world rightly." (TLP 6.54) A language based on this proposition could be built by recognizing the limitations of our current means of communication and by

would love that language, although there would still be a lot we would have to remain in silence about, and it would lead to an over complexification of language, as one would not be able to simply say that π is 3.14, and would have also to say why that approximation is being used in the context at hand.

For the time being, the way we use our language allows for a lot of room for error, but if one is familiar with the language – or should we say language-games – and its nuances, the primary objective of that language is fulfilled, a message can be transmitted with little interference and a better (more adequate) representation of reality can be made. Human knowledge did not evolve because we were trying to say everything correctly the first time around, but because we discovered flaws with the way we dealt with the physicality of the universe – our language was not adequate – and we tried to diminish the wrongs in our representation of reality. So the question now is not if we can say anything with 100% certainty, but whether we can establish knowledge in the sense of giving an adequate response to reality, and if so, in which conditions.

We might find ourselves before a semantics problem. If we say that there are no conditions for us to know, does not that imply that the conditions to know must exist, even if they are currently out of reach?

2.4 Early vs Later Wittgenstein on Language and Knowledge

Wittgenstein's philosophical journey is as peculiar as the author's life. The author's engineering background helps us understand his objective interest in reality and the thought process behind the *Tractatus*, the diary notes published in the *Notebooks 1914-1916*, the pursuit for one truth and the relationship between reality and himself through logic.[45] Analyzing the *Tractatus* and the *Investigations*, together with the observations that comprise the *Notebooks*, the reader might at

merely allowing the description of events. See page 27 and OC §443. For instance, in this fictitious language, the sentence "that is a tree" would be senseless. One could alternatively say "I see a tree" - The "brain in a vat" is always a threat. However, would such a language allow knowledge?

[45] See Hacker. P.M.S., *Insight and Illusion* (Bristol*:* Thoemmes Press, 1997).

first be under the impression that Wittgenstein's thought changed radically from his earlier to his later work, considering the different perspectives with which the author apparently approaches language in these two works. In fact, while the *Tractatus* seems to contemplate a pure logic behind language, the *Investigations* transmits the idea that the author rebelled against this view of a pure logic beneath language, with the elaboration of the language-games concept in the framework of which this or that sentence is allowed within certain contexts, within what the author sees as the language rules of engagement.[46]

The author then tries to search for the rules which would allow a sentence to make sense while others would not. This might suggest to us that Wittgenstein has changed his mind over time. However, what might initially look like a complete change of perspective, may not correspond to the reality given Wittgenstein's proposition 6.54 from the *Tractatus*[47]:

> My propositions are elucidatory in this way: he who understands me finally recognizes them as senseless, when he has climbed out through them, on them, over them. (He must so to speak throw away the ladder, after he has climbed up on it.) He must surmount these propositions; then he sees the world rightly. (TLP 6.54)

The author seems to be launching the motto for the thought behind the *Investigations*, which seems to be nothing more than the "logical" follow-up of the *Tractatus* and of his own inquisitive thoughts first written down in the *Notebooks.* In this sense, we must agree with Rhees when he

[46] The concept of language-game also appears in other writings from Wittgenstein, but the *Investigations* give this concept context and body.

[47] Although Wittgenstein only got to publish the *Tractatus Logico-Philosophicus* during his lifetime, the majority of his work that is available to us lets us realize how immense and complex his life's work is and the impact his reasoning would have in the philosophical community. Can we now be able to climb all the steps of the ladder that Wittgenstein let go off?

states that "Wittgenstein's earliest and last concern was: what does it mean to say something?"[48].

2.5 Knowledge and Intelligence

After discussing knowledge, language and their connection using Wittgenstein's work as the ground for these discussions, some remarks on intelligence are required and the relationship between knowledge and intelligence is also worthy of discussion. Intelligence, defined as the ability to learn, understand, make judgements and have opinions based on reason, is the ability that many believe distinguishes us from the other animals.

The difference between knowledge and intelligence seems to lie in the applicability of one to the other, in the sense that knowledge can be regarded as information about reality that has meaning to intelligence[49]. Knowledge without intelligence is what can be described as an empty Great Library of Alexandria or an empty university. Intelligence without knowledge is *potentia*. Should we dare to say that intelligence is what allowed us to develop language and from then on, to relate rationally with reality and construct knowledge?

One thing is certain. All the concepts we have been discussing were constructed by man and it is not surprising that we find their definitions conflicting and in a certain way merging together. In reality, nature does not have concepts about itself and just *is*. Even the definition of the word "concept" can be discussed or, as Wittgenstein wrote, "'Concept' is a vague concept"[50] (RFM §70, 433). We, as humans, tend to organize our understanding of reality in boxes and shelves, but we often find that we have questions that do not fit into any particular box and that spread in reach to multiples boxes. On the topic of intelligence, as the concept is generally understood, it is safe to say that it is human's biggest asset in our quest to understand reality. Throughout history, the work philosophers have done in trying to discover the boundaries of

[48] For further details, see Rhees, R. *Wittgenstein's* On Certainty*: There - Like Our Life.* Oxford: Blackwell, 2003, 6-11.
[49] Knowledge vs intelligence: The difference explained: https://simplicable.com/new/knowledge-vs-intelligence
[50] Wittgenstein, L. *Remarks on the Foundations of Mathematics*. Edited by G.E.M Anscombe, R. Rhees and G. H. von Wright. Translated by G. E. M. Anscombe. Oxford: Blackwell, 1956.

what can be understood (notice we did not use the word *know*), and in which conditions we are able to do so, if any exist, help us comprehend our own limitations as a species that has already accomplished a lot, civilizationally speaking, but it is still riddled with anthropological related problems such as poverty, war and the destruction of the natural habitats that we inhabit.[51]

We believe that the fact that we as humans are aware of our own limitations is one of the reasons that propels us to want to discover more and more and to gain a better grasp of reality so as to try to overcome these limitations. This is the reason why it makes sense for us to discuss the implications of the digital revolution and of artificial intelligence, the latter being a topic also discussed by Wittgenstein.

[51] The difficulty lies precisely in terms of language. Language, ever evolving and dependent on the speakers, adapts itself to the historical culture and values. Do we grasp all the concepts present in a Shakespeare play? Would Shakespeare understand English language as it is spoken today?

3. Language and Knowledge after Wittgenstein

In this chapter, Wittgenstein's inheritance will be presented. Firstly, we will make a short summary of the most important thoughts and remarks from Wittgenstein in order to analyze which part of Wittgenstein's work turned out to be more impactful for society and how that truly represents what we will name "Wittgenstein's ladder". This will serve to help us understand how best to employ Wittgenstein's work today (section 3.1). We will also discuss the advent of artificial intelligence in this chapter, its challenges and possibilities.

3.1 Wittgenstein's Legacy

Contemplating Wittgenstein's work, it is easily noticeable that a change occurred from the author's early writings to his later ones. Is this change enough to warrant analyzing them separately, or should we just look at those differences as changes in perspective throughout his life? Did the author's way of thinking really change that much? Wittgenstein's work is such that his inquisitive nature is always at the forefront of his thoughts and that this author's trodden path is in itself much more one of questions than one of answers, as we can see through the so called "difference" between the ideas displayed in the *Tractatus* and those displayed in the *Investigations.* Wittgenstein's work is meaningful and its impact cannot be neglected. Here is a short summary of Wittgenstein's main achievements which may help us to perceive how these can help us move further along.

Without any doubt (should we even dare to say that?), propositions 6.54 and 5.6 of the *Tractatus* are two of Wittgenstein's most recognizable remarks. These propositions, coupled with the concept of language-games introduced in the *Investigations* and with the analysis of entries in the *Notebooks,* are enough to give us some idea of what the author was up to and show us that he felt like he did not succeed at that as he initially thought he did in the *Tractatus*. Delving into Wittgenstein's life and work, can we easily establish the truth and the falsehood in

Wittgenstein's discourse? Can we recognize where he is right and where he is wrong? Can we do more than perhaps just talk about what we should not talk about? Was this not precisely what Wittgenstein was doing while searching for a closed logic behind language and while establishing the concept of language-games?

The question still to be answered is: can we know anything at all? Perhaps we, as Wittgenstein stated in *Philosophical Grammar*[52], can only ask certain questions and get the answers to those questions. Our knowledge would then be limited. Perhaps, the realization that we can only ask certain questions could lead us to understand that we are asking the wrong questions. Perhaps we should not ask if we can know, perhaps we should instead ask if we can understand, not ask if we can establish knowledge *a priori* but if our understanding of reality establishes an *adæquatio*.[53] In this sense, Wittgenstein himself seem to be "adequate". Even though his Tractarian propositions were very incisive and purposely conclusive, the majority of his works convey an open-ended message and more questions than answers are present. This I believe is the best example of "Wittgenstein's ladder". Not a ladder that we store for times in need, but a ladder that once used no longer serves us, for we have to find/build a different one to take us one step higher in the process of understanding the reality we are inserted in. It seems though as if a definite answer to the question "can we know and in which conditions?" will remain hidden for the time being. For now, we satisfy ourselves in "knowing" that we can understand our reality, and, perhaps more importantly, in "knowing" that we can better our understanding of reality and of ourselves.[54]

The "truth" is that Wittgenstein is consequential. His work led to a great deal of discussion and the fact that we even find it necessary to discuss whether there is one, two or even three stages of "Wittgenstein" makes us aware of the importance of his life's work.

For us, the biggest lesson we take from Wittgenstein is that knowledge is nothing if not used to build wisdom, where we use wisdom to mean an understanding of reality that presents

[52] I here refer to section 2.2 of this thesis.
[53] See Venturinha's take on *adæquatio* and his perspective on propositional meaning (Venturinha, N., *Lógica, Ética, Gramática: Wittgenstein e o Método da Filosofia*. Lisboa: Imprensa Nacional-Casa da Moeda, 2010, §4. b) to get another view on these concepts.
[54] We believe that this has been proved by human evolution.

utility for human beings. All the data, information and knowledge collected by humankind inside books, CDs, Hard-drives and Flash-drives represent nothing more than "potential energy". Only relating with reality through language, expanding our "knowledge" and striving for wisdom can we truly utilize this "potential", expand our world and understand our place in existence.

3.2 AI and the "bit" Revolution

> The real problem is not whether machines think but whether men do.
> (B.F. Skinner, *Contingencies of Reinforcement*)[55]

Since the invention of the wheel (in truth it had to be even before that), mankind has strived to do the greatest amount of work with the least amount of possible effort. In a humorous way, some of us even dare to say that human ingenuity arises from human's laziness. What is a fact is that humans have developed complex processes and technologies to simplify our lives so that more time can be better spent elsewhere. Digital technology is no different.

As of today, it is sometimes easier to get an answer to a question we have from the other side of the globe than it might be to ask a neighbor for eggs or flour. Technology has a lot of upsides and downsides. With the mechanization of complex tasks, the ability that robots nowadays have to work with the same level of precision relentlessly, and the development of new programming languages, making even more complex problems solvable, the question about what will happen to manual labor arises and a scenario where a machine with superintelligence appears is already imaginable for us. In this section there will be a brief discussion about the topic of artificial intelligence, namely regarding what artificial intelligence really is, the paths to get there, the dangers and challenges related to the broad scale implementation of artificial intelligence and the strategies we might have available to make sure the appearance of an

[55] Skinner, B. F. *Contingencies of reinforcement: A theoretical analysis.* New York: Appleton-Century-Crofts, 1969.

artificially intelligent being does not result in a Terminator like scenario. For this, our main theoretical support is the work *Superintelligence* by Nick Bostrom[56].

Artificial Intelligence, generally regarded as the capacity a system/machine would have to think for itself and have cognitive functions like a human, such as learning and solving problems, can be better defined as the capacity present in an artificial system to understand its environment and to autonomously take actions to improve the probability of achieving its objectives and minimize the chance of failure. The concept "artificial intelligence" seems to have been coined by Alan Turing in the 1930's[57]. Interestingly enough, Wittgenstein had long discussions with Turing in 1939, discussions that are available to us through Wittgenstein's *Lectures on the Foundations of Mathematics*[58]. In the 1930s Wittgenstein was also involved in philosophical reflections about whether a machine can think. In the *Blue Book*[59], the author wonders about the concept of a 'thinking machine' and whether there is a real possibility of that happening.

> "Is it possible for a machine to think?" (whether the action of this machine can be described and predicted by the laws of physics or, possibly, only by laws of a different kind applying to the behaviour of organisms). And the trouble which is expressed in this question is not really that we don't yet know a machine which could do the job. The question is not analogous to that which someone might have asked a hundred years ago: "Can a machine liquefy a gas?" The trouble is rather that the sentence, "A machine thinks (perceives, wishes)": seems somehow nonsensical. It is as though we had asked "Has the number 3 a colour?" (BB, 47)

[56] Bostrom, N. *Superintelligence: Paths, Dangers, Strategies*. Oxford: Oxford University Press, 2014.
[57] Alan Turing is generally regarded as the father of AI and his work served not only to advance science and knowledge but to help the Allies in WWI. See Turing, A., "Intelligent machinery", in B. Meltzer and D. Michie (eds), *Machine Intelligence 5*, Edinburgh: Edinburgh University Press, 1948; "Computing Machinery and Intelligence", in Alan Ross Anderson (ed.), *Minds and Machines,* Englewood Cliffs, New Jersey: Prentice-Hall, 1950; *Intelligent Machinery: A Heretical View*. Cambridge: Heffers, 1959.
[58] Wittgenstein, L., *Wittgenstein's lectures on the Foundations of Mathematics*. Cambridge, 1939: from the notes of R. G. Bosaquent, Norman Malcolm, Rush Rhees and Yorick Smythies. Edited by Cora Diamond. New York: Cornell University Pres, 1976.
[59] Wittgenstein, L., *The Blue and Brown Books*. Oxford: Blackwell, 1958.

In the same period, in *Philosophical Grammar*, Wittgenstein wrote:

> If one thinks of thought as something specifically human and organic, one is inclined to ask "could there be a prosthetic apparatus for thinking, an inorganic substitute for thought?" But if thinking consists only in writing or speaking, why shouldn't a machine do it? "Yes, but the machine doesn't know anything." Certainly it is senseless to talk of a prosthetic substitute for seeing and hearing. We do talk of artificial feet, but not of artificial pains in the foot.
>
> "But could a machine think?"--Could it be in pain?--Here the important thing is what one means by something *being in* pain. I can look on another person--another person's *body*--as a machine which is in pain. And so, of course, I can in the case of my own body. On the other hand, the phenomenon of pain which I describe when I say something like "I have toothache" doesn't presuppose a physical body. (I can have toothache without teeth.) And in this case there is no room for the machine.--It is clear that the machine can only replace a physical body. And in the sense in which we can say of such a body that it is in pain, we can say it of a machine as well. Or again, what we can compare with machines and call machines is the *bodies* we say are in pain. (PG, 105)

Perhaps more important than asking whether a machine can think, it is whether it can understand concepts, contexts, language-games, relate acquired knowledge with reality and learn from experience. And after we have those questions answered, we can wonder about the motivations an AI will have when thinking and evolving, believing that these processes have the potential to happen at a pace much faster than that of humans. While not directly addressing the AI problematic, Wittgenstein's thoughts are very insightful and can, once again, be used as a "ladder" in the discussion on these concepts.[60]

In order for us to understand the AI discussion, we need to distinguish two concepts, "superintelligence" and "artificial intelligence". AI refers to intelligence that has a non-biological

[60] Stuart Shanker does precisely this by using Wittgenstein's remarks to discuss the foundation of AI, coupled with the concepts introduced by Turing. A complete discussion of the foundation of AI lies outside the scope of this dissertation but, for further developments, see Shanker, S., *Wittgenstein's Remarks on the Foundations of AI* (London: Routledge, 1998).

substrate, while there might be a biological form of superintelligence, namely if the biological processes that brought us to this state of intelligence continue to pressure our species in the direction of greater intellect. Naturally, when we think about an AI that has the same intellectual capabilities as humans have as of today, it is not difficult to believe that AI can easily surpass our general intelligence and become an artificial superintelligence. When one thinks about AI, what generally comes to mind is either a doomsday scenario where the human species is relegated to the sidelines, or a God-like scenario, where AI leads us to uncover all the secrets of the universe which are not in our reach. If we recognize both scenarios just presented as plausible, the contours of the problem at hand are far more reaching in their implications and challenges than this short description may entail.

Regarding achieving AI technology, generally emulating a whole brain is the most commonly accepted way to think about how AI will be achieved. It represents the idea that we might eventually be able to understand well enough how our brains work and that we might be able to replicate this process in a machine by scanning and closely modelling our own brains, in fact creating an AI being. This idea presupposes great scientific and technological advances that are still only being theoretically discussed.

Another point worthy of attention is the pace at which we will experience a superintelligence take-over. If we can create a machine that reaches our intellect in capability, when the time comes that a machine attains general intelligence at the human-level, how fast will it be until it achieves a level of intelligence multiple times that of humans? Will we see a slow take-off, over years or even decades, or a fast take-off, over minutes or hours? And once an AI project is successful, will it dominate and obscure all the remaining attempts at achieving AI or will there be multiple successful projects? The answers to these questions are for now out of reach, but these answers will dictate where we will arrive when an AI with an intellect superior to that of humans is reached.

But the most important issue seems to be that of control and motivation of the AI. How can we guarantee that obtaining a super intelligent AI will be beneficial to humankind and that it will not lead to an extinction level event? What kind of motivations can we imprint the system with, in order to make sure it does not overrule its creators and that its objectives are coherent

with what we are trying to achieve with the creation of an artificial intelligence? In the same manner, what kind of protocols can we put in place in order to assure that the artificial intelligence(s) remain under our control? Can we modulate values and a morality system to try and keep the objectives of the AI under certain parameters?

The advent of an Artificial Superintelligence is an event disruptive enough that should scare us enough to make us think. "Us" as a species and "think" as to leave no logical, ethical… philosophical… rock unturned. The consequences of a programming "bug" at this level could prove to be disastrous and even though we tend to dismiss the consequences of the actions of a few, it has always been only a few details, a few people, that changed the course of history over and over. Would someone uncover the theory of general relativity had Einstein not existed? Would there have been World War II if Hitler had never been born? We will never know the answer to these questions, but we can be sure that to neglect the actions of a few is to gamble with the lives of millions.

One of the most important questions that arises from the discussion about superintelligent artificial intelligence is whether knowledge is limited or unlimited. So far we have already established that knowledge is a "vague" concept[61] and that the answer to the question of whether we can actually know is not yet closed. AI will not help us find answers to questions that do not have them, and this might as well be one of those. However, if we can devise an AI that has the same "curiosity" as the human kind, we can rest assured that a lot of questions with which we struggle will be answered fairly easily by machines, and that those answers will be a very important help in our quest for understanding our micro-cosmos.

In line with the work of Nick Bostrom, and also a lot of the philosophical work developed by humanity, there seem to be more questions than answers. Sometimes it looks, however, as if the most important aspect is not to have all the answers, but to have had the opportunity to think about the different alternatives available and different ways one can think about a specific challenge. Considering all that has already been said and all that will still be said about AI, we find it fit to finish this section and chapter with an alert left by Nick Bostrom about Superintelligence:

[61] Using Wittgenstein's own words regarding concepts. See section 2.5.

Before the prospect of an intelligence explosion, we humans are all small children playing with a bomb. Such is the mismatch between the power of our plaything and the immaturity of our conduct. Superintelligence is a challenge for which we are not ready now and will not be ready for a long time. We have little idea when the detonation will occur, though if we hold the device to our ear we can hear a faint ticking sound.[62]

[62] Bostrom, N., *Superintelligence: Paths, Dangers, Strategies*. Oxford: Oxford University Press, 2014, 319.

4. Conclusions

The main objective of this work was to study the concepts of language and knowledge and to try to understand if they are connected. For this we set ourselves to use Wittgenstein's work to see if there is a link between language and knowledge. We proposed to show that knowledge is possible and that human evolution drives from it and to show that we, in fact, are limited by our language and that we can only expand our understanding of reality and construct knowledge when we expand our language.

Second, we intended to raise a discussion regarding what Wittgenstein helped us achieve so far and looking further into the future, to make a brief introduction to what it holds for us regarding the advent of artificial intelligence.

4.1 Achievements

The major achievements of the present work were the understanding that:

(i) Language and knowledge must be connected;
(ii) Language stands between subject and reality (inner and outer world);
(iii) Our conception of reality is flawed by the own nature of the concepts we use in our daily 'language-games'
(iv) Wittgenstein's work is a ladder for a better comprehension of the questions behind many philosophical problems;
(v) We have new challenges ahead, namely regarding AI and its advent, but also a huge opportunity to expand our comprehension of the phenomena that surround us.

4.2 Future Work

During the research developed for this dissertation, several topics worthy of discussion by themselves were found and they deserve to be mentioned:

(i) A deeper analysis of linguistics and neurosciences could enrich the initial analysis of language;

(ii) An analysis of the topics discussed here cannot be complete without an in-depth study of the precursors of Wittgenstein, namely Gottlob Frege and Bertrand Russell;

(iii) Regarding the topics discussed in chapter 3, and specifically regarding Wittgenstein's legacy, a more complete analysis of the authors that have studied and analyzed this author's work could also help us enhance our own analysis.

(iv) Still on chapter 3 and regarding the brief discussion on AI, it would be good to perform a more exhaustive discussion/comparison between the work of Turing and the work of Wittgenstein on the topics of machine intelligence.

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